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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)

5649-1265

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on January 8, 2007

Signature

Typed or printed name Amelia Tauchen

Application Number

10/796,437

Filed

03/09/2004

First Named Inventor

Jung-hun Seo

Art Unit

2822

Examiner

Christy L. Novacek

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.☐ assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)☒ attorney or agent of record. 42,011
Registration number☐ attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34 _____

Signature

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Telephone number

January 8, 2007

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**RESPONSE UNDER 37 C.F.R. 1.116
EXPEDITED PROCEDURE--EXAMINING GROUP 2822**

Attorney Docket No. 5649-1265

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Jung-hun Seo et al.

Serial No.: 10/796,437

Filed: March 9, 2004

For: **METHODS OF FORMING A CONDUCTIVE STRUCTURE IN AN INTEGRATED
CIRCUIT DEVICE**

Confirmation No. 1822

Group Art Unit: 2822

Examiner: Christy L. Novacek

Date: January 8, 2007

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Amelia Tauchen
Amelia Tauchen

**REASONS IN SUPPORT OF APPLICANTS' PRE-APPEAL
BRIEF REQUEST FOR REVIEW AND INTERVIEW SUMMARY**

Sir:

This document is submitted in support of the Pre-Appeal Brief Request for Review filed concurrently with a Notice of Appeal in compliance with 37 C.F.R. 41.31 and with the rules set out in the OG of July 12, 2005 for the New Appeal Brief Conference Pilot Program, which have been extended indefinitely

No fee or extension of time is believed due for this request. However, if any fee or extension of time for this request is required, Applicant requests that this be considered a petition therefor. The Commissioner is hereby authorized to charge any additional fee, which may be required, or credit any refund, to our Deposit Account No. 50-0220.

REMARKS

Applicants hereby request a Pre-Appeal Brief Review (hereinafter "Request") of the claims finally rejected in the Final Office Action mailed September 8, 2006 (hereinafter "Final Action"). The Request is provided herewith in accordance with the rules set out in the OG dated July 12, 2005.

Applicants respectfully submit that the rejections of the currently pending claims are clearly erroneous because many of the recitations of the pending claims are not met by the cited references for at least the reasons discussed herein and in Applicants' previously filed Request For Reconsideration of June 14, 2006. Therefore, Applicants respectfully request review of the present application by an appeal conference prior to the filing of an appeal brief. In the interest of brevity and without waiving the right to argue additional grounds should this Petition be denied, Applicants will only discuss the recitations of independent Claims 1 and 24.

Independent Claims 1 and 24 are Patentable

Independent Claims 1 and 24 stand rejected under 35 U.S.C. §102(b) as being anticipated by U. S. Patent No. 6,838,772 to Saitoh et al. (hereinafter "Saitoh"). (Final Action, page 2).

Independent Claim 1 recites, in part:

...
forming a barrier metal layer on the lower conductive pattern;
flushing the barrier metal layer with a gas that comprises a halogen
group gas;
...

Similarly, independent Claim 24 recites, in part:

...
depositing a barrier metal layer on the semiconductor substrate with
the lower conductive pattern using a metal organic precursor;
flushing the deposited metal layer; and
forming an upper conductive layer on the semiconductor substrate with
the flushed barrier metal layer,
wherein the step of flushing the barrier metal layer uses a processing
gas including TiCl_4 gas and argon gas.

Thus, according to independent Claims 1 and 24 a barrier metal layer is flushed using a halogen gas generally or, in particular (Claim 24), by using the halogen gas TiCl_4 along with argon gas.

In rejecting independent Claims 1 and 24, the Final Action cites the description accompanying FIGS. 11 - 14 of Saitoh at columns 19 - 22. In reviewing this passage, however, Applicants are unable to find any mention of using a halogen group gas or TiCl_4 gas for flushing a barrier metal layer. Applicants acknowledge that Saitoh describes gases that incorporate a halogen, such as chlorine. Saitoh describes these gases, however, as being used to form the conductor film 17b2, not as part of a flushing operation on any of the conductor film 17b layers. (Saitoh, col. 21, lines 12 - 59). Saitoh does state that argon gas can be used to clean the surface of a TiCl_4 layer as part of forming the conductor film 17b2 (Saitoh, col. 21, lines 38 - 42). Argon gas, however, is not a halogen group gas and the TiCl_4 gas used to form the TiCl_4 layer is not used as part of the cleaning/flushing process.

In response to these arguments, the Final Action states that "[t]he term 'flushing' has not been given any special meaning or definition by Applicant..." (Final Action, page 5). Applicants respectfully disagree. The Specification at page 12, lines 7 - 13 states:

Some embodiments of the present invention provide a method for forming a conductive structure that includes flushing a barrier metal layer formed by using metal organic chemical vapor deposition or atomic layer deposition. The barrier metal layer can be formed at a relatively low temperature by using metal organic chemical vapor deposition or atomic layer deposition. The flushing process for cleaning the surface of the barrier metal layer may reduce problems resulting from an insufficient removal of carbon and outgassing oxygen. (Emphasis added).

As highlighted above, the Specification makes clear that "flushing" refers to a "cleaning" operation. The Final Action continues to argue that Saitoh's teachings regarding the formation of the conductor film 17b2 by depositing a TiCl_4 layer on the sidewalls and bottom surface of the through-hole 19 using TiCl_4 gas (Saitoh, col. 21, lines 34 - 38) corresponds to the flushing recitation of independent Claims 1 and 24. (Final Action, page 6). But as explained above, a flushing operation is a cleaning operation. The deposition of a TiCl_4 layer in the through-hole 19 is part of the formation of the TiSiN film 17b2 and does not involve a cleaning operation; therefore, the deposition of the TiCl_4 layer cannot correspond to the flushing recitation of independent Claims 1 and 24. As discussed above, Saitoh does state

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that argon gas can be used to clean the surface of the TiCl_4 layer as part of forming the conductor film 17b2 (Saitoh, col. 21, lines 38 - 42). Argon gas, however, is not a halogen group gas as recited in independent Claim 1 and independent Claim 24 requires *both* argon gas and TiCl_4 gas be used as the processing gas for the flushing operation.

For at least the foregoing reasons, Applicants respectfully request that the present application be reviewed and that the rejection of independent Claims 1 and 24 be reversed by the appeal conference prior to the filing of an appeal brief.

Respectfully submitted,



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